

Specifications

Table 1: Technical Specifications	
INPUT	
Input voltage range	90–264 V ac; 120–300 V dc; single-phase
Frequency	47–63 Hz
Inrush current	40 A peak maximum (soft start)
Efficiency	Up to 85% at full load
Power factor	0.99 typical
Turn-on time	Ac on 1.5 s typical, inhibit/enable 150 ms typical, configurable through I ² C; 50 ms internal turn-on delay (dual output only)
Hold-up time	10 ms minimum
AC OK	>5 ms early warning before outputs lose regulation, full cycle ride at 50 Hz, configurable through I ² C
OUTPUT	
Output voltage range	±10% minimum for all outputs, user-adjustable pot, full adjustment range using I ² C
Factory set point accuracy	1%
I ² C output program accuracy	±5%
Margining	±4–6% nominal analog (single output module only)
Line/load regulation	0.4% or 20 mV maximum (1% maximum for 1500 W module)
Ripple	RMS: 0.1% or 10 mV maximum; Pk-Pk: 1.0% or 50 mV maximum; bandwidth limited to 20 MHz
Dynamic response	<2% or 100 mV with 25% load step
Recovery time	Within 1% in <300 μs
Overcurrent protection	Single output module and main output of the dual output module 105–120% of rated output current. Aux output of dual output module 105–140% of rated output current. Special programmable OCP delay on 1500 W module from 100 ms to 25.5 s with shutdown features. Configurable through I ² C with load calibration required (except for 1500 W module).
Short-circuit protection	Protected for continuous short-circuit; recovery is automatic upon removal of short. Shutdown mode available on the 1500 W module.
Overvoltage protection	Single output module: 2–5.5 V, 122–134%; 6–60 V, 110–120% Dual output module: 2–6 V, 122–134%; 8–28 V, 110–120% Triple output module: No overvoltage protection provided Configurable through I ² C
Thermal protection	All outputs are disabled when the internal temperature exceeds the safe operating range; configurable through I ² C
Remote sense	Up to 0.5 V drop (not available on triple output module)
Single wire parallel	Current share to within 2% of total rated current
DC OK	±5% of nominal; configurable through I ² C
Minimum load	Not required
Housekeeping bias voltage	5 V dc @ 1.0 A maximum present whenever ac input is applied
Module inhibit	Configured and controlled through I ² C
Output/output isolation	>1 MΩ, 500 V
Global inhibit/enable	TTL, Logic “1” and Logic “0”; configurable through I ² C
ENVIRONMENTAL	
Operating temperature	-40 °C to +70 °C ambient; derate each output 2.5% per degree from 50 °C to 70 °C; -20 °C start up
Storage temperature	-40 °C to +85 °C
Humidity	10% to 95% RH, non-condensing
Vibration	IEC68-2-6 to the levels of IEC721-3-2
MTBF demonstrated	>550,000 hr. @ full load, 220 V ac, 25 °C ambient
SAFETY	
Electromagnetic susceptibility	EN61000-4-2, EN61000-4-4, EN61000-4-5 Level 3
Conducted EMI	CISPR 22/EN55022 Level B when installed in a properly grounded and shielded metal enclosure
Radiated EMI	CISPR 22/EN55022 Level B when installed in a properly grounded and shielded metal enclosure
Certifications	 UL/CSA 60950-1 2 nd Edition, CE to LVD 2006/95/EC, EN60950-1/A11:2009
GENERAL	
Case specifications	SH30 Series: 5 in. x 5 in. x 11 in. [127.0 mm x 127.0 mm x 279.4 mm], 1500 W–3210 W, 09 slots available, 6.2 lb. SH45 Series: 5 in. x 8 in. x 11 in. [127.0 mm x 203.2 mm x 279.4 mm], 1800 W–4500 W, 14 slots available, 9.0 lb.
Module weights	210 W single: 0.6 lb.; 360 W single: 1.0 lb.; 600 W single: 2.0 lb.; 750 W single: 1.6 lb.; 1500 W single: 2.0 lb.; 144 W dual: 0.6 lb.; 36 W triple: 0.5 lb.
Limited warranty	3 years

Connectors

Table 2: Ac Input			
<div><div><div></div><div>1</div><div>2</div><div>3</div><div></div></div><div><div><div></div></div><div><div></div><div>~</div><div></div></div><div><div><div></div></div><div></div><div></div></div></div></div> <div>BARRIER TYPE SH30: THREE #6-32 B.H. SCREWS 6 in.-lb. (0.67 N-m) MAX. TORQUE SH45: THREE M4 SCREWS 7 in.-lb. (0.79 N-m) MAX. TORQUE</div>	PIN #	FUNCTION	
	1	Ac neutral	Dc -
	2	Ac line (hot)	Dc +
	3	Chassis (earth) ground	

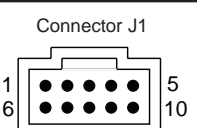
Table 3: PFC Input Connector (Control & Signals)		
<div>Connector J1</div>  <p>MATES WITH: MOLEX 90142-0010 HOUSING MOLEX 90119-2110 TERMINAL CONNECTOR KIT AVAILABLE, PART NUMBER 70-841-004</p>	PIN #	FUNCTION
	1	Input ac OK (emitter)
	2	Input ac OK (collector)
	3	Global dc OK (emitter)
	4	Global dc OK (collector)
	5	No connection
	6	Global inhibit/optional enable logic "0"
	7	Global inhibit/optional enable logic "1"
	8	Global inhibit/optional enable return
	9	+5 VSB housekeeping (1 A max.)
10	+5 VSB housekeeping return	

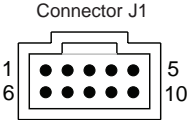
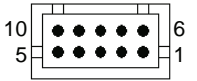
Table 4: Dc Output Module Connector (Control & Signals)		
<div><p>Connector J1</p></div> <p>MATES WITH: MOLEX 90142-0010 HOUSING MOLEX 90119-2110 TERMINAL CONNECTOR KIT AVAILABLE, PART NUMBER 70-841-004</p>	PIN #	FUNCTION
	1	+ Remote sense (single or dual o/p main)
	2	Remote margin/V. program (single o/p)
	3	Margin high (single o/p)
	4	- Remote sense/margin low (single or dual o/p main)
	5	Spare
	6	Module isolated inhibit (single or dual o/p)
	7	Module inhibit return (single or dual o/p)
	8	Current share (SWP) (single or dual o/p main)
	9	+ Remote sense V2 (dual o/p, single is spare)
10	- Remote sense V2 (dual o/p, single is spare)	

Table 5: I ² C Bus Output Connector			
<div>Connector J2</div> 		PIN #	FUNCTION
		1	No connection
		2	
		3	
		4	Serial clock signal (SCL)
		5	Serial data signal (SDA)
		6	Address bit 0 (A0)
		7	Address bit 1 (A1)
		8	Address bit 2 (A2)
		9	Secondary return (GND)
MATES WITH: JST PHDR-10VS HOUSING JST SPHD-002T-P0.5 TERMINAL (FOR 24-28 AWG WIRE) JST SPHD-001T-P0.5 TERMINAL (FOR 24-28 AWG WIRE) <u>OR</u> LANDWIN 2050S1000 HOUSING LANDWIN 2053T011P TERMINAL CONNECTOR KIT AVAILABLE, PART NUMBER 70-841-023		10	5 VCC external bus (1 A max.)

NOTES:

- M4 x 8mm screws for all single output modules; maximum torque is 10 in.-lb. (1.13 N-m). M3 x 8mm screws for dual output module; maximum torque is 5 in.-lb. (0.57 N-m).
- 36 W triple output module mates with Molex 09-91-0600 housing and Molex 26-60-5060 terminal.
- Single and dual output modules have a green DC OK LED.

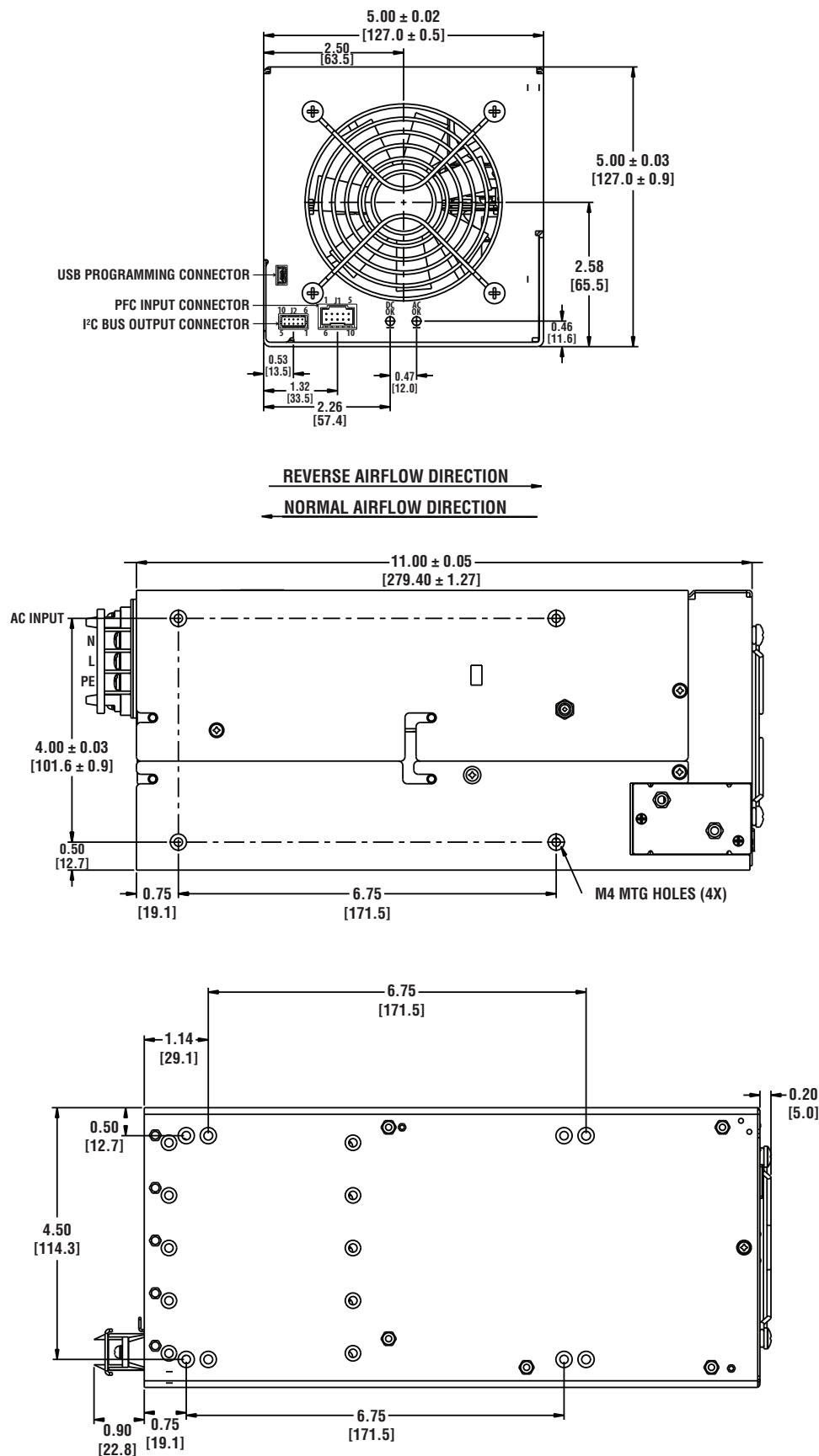
Installation/Safety Requirements

⚠ WARNING—RISK OF ELECTRICAL SHOCK

No user-serviceable parts. Do not open the power supply. Do not replace components.

- The earth ground wire must be connected only to the point marked with the earth ground symbol (on the unit). If the earth ground wire is connected by a screw, the wire must have a ring terminal secured by a lock washer to prevent accidental loosening.
- A safety approved (e.g. UL, CSA, CE) power cord and plug, with an appropriate wire gauge for the rated input current, must be provided by the end system manufacturer. Additional ferrites may be required on the power cord for radiated emissions testing and are system dependent.
- The power supply must be installed in a properly grounded and shielded metal enclosure.
- An accessible disconnect device shall be installed external to the equipment.
- The power supply is CE marked following the provisions of the Low Voltage Directive 2006/95/EC only.
- Please refer to our Web site for additional information on the optional CANBUS/RS485 interface.

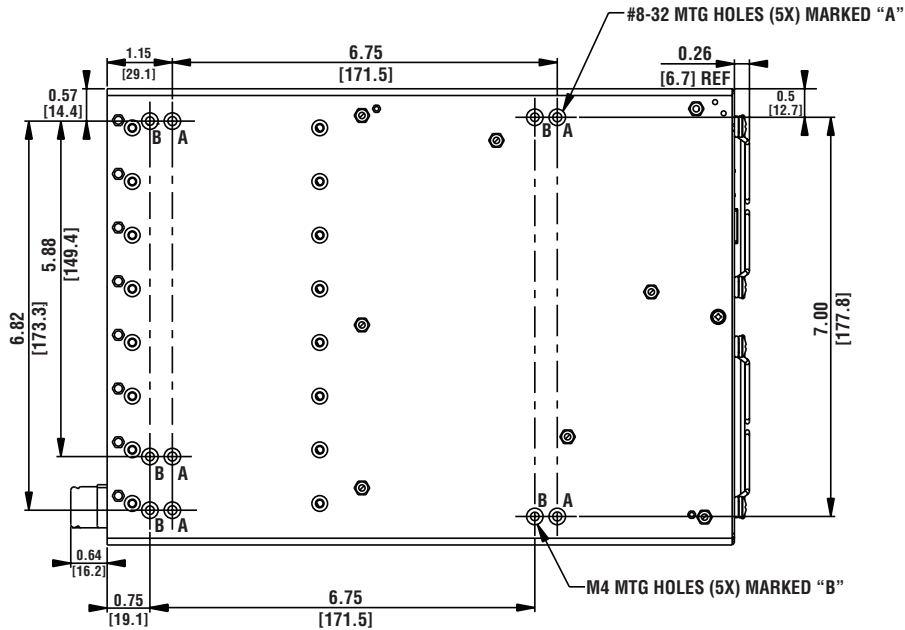
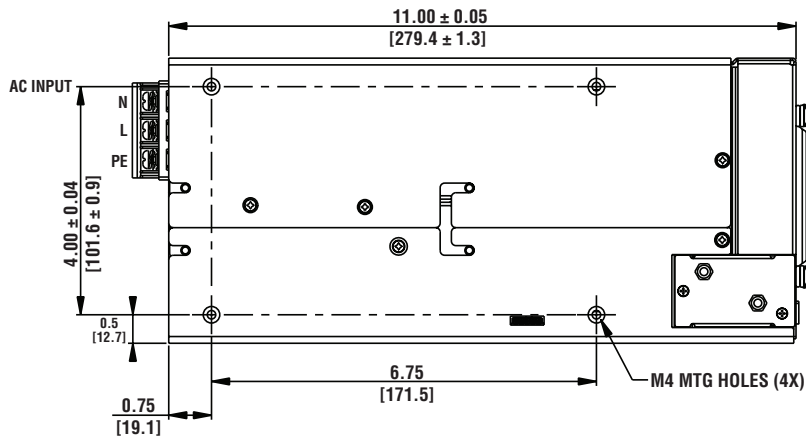
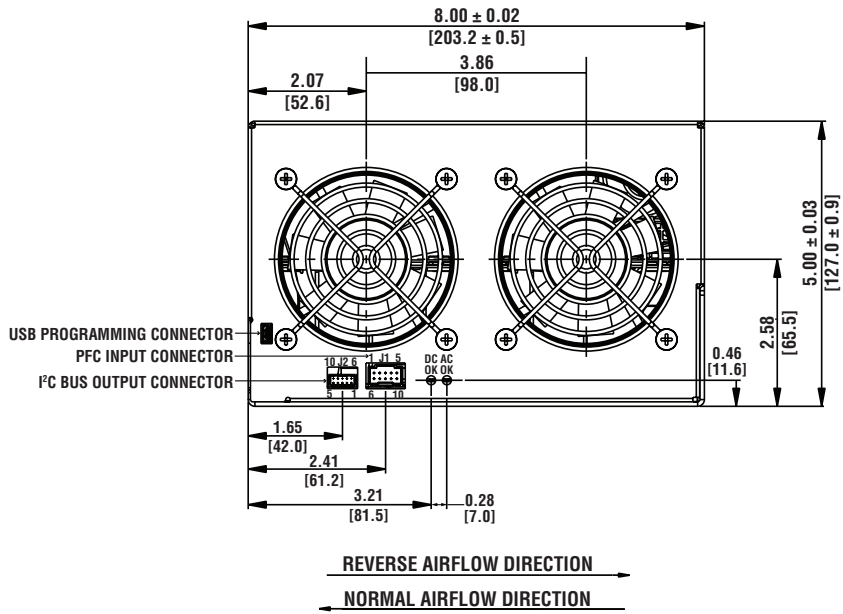
SH30 Series (1500/3210 W Maximum)



NOTES:

- M4 mounting holes on 3 sides; #8-32 mounting holes on the bottom. Maximum penetration is 0.155 in. (4.0 mm); maximum torque is 5 in.-lb. (0.57 N-m).
- All dimensions are typical, with inches and [millimeters] shown.

SH45 Series (1800/4500 W Maximum)



NOTES:


- M4 mounting holes on 3 sides; #8-32 mounting holes on the bottom. Maximum penetration is 0.155 in. (4.0 mm); maximum torque is 5 in.-lb. (0.57 N-m).
- All dimensions are typical, with inches and [millimeters] shown.



While every precaution has been taken to ensure accuracy and completeness in this manual, EGS Electrical Group, LLC, assumes no responsibility, and disclaims all liability for damages resulting from use of this information or for any errors or omissions. Specifications are subject to change without notice. The Solahd and Emerson logos are registered in the U.S. Patent and Trademark Office. All other product or service names are the property of their registered owners. ©2012 EGS Electrical Group, LLC. All rights reserved.

Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com

Specifications

Table 1: Technical Specifications	
INPUT	
Input voltage range	170–264 V ac, three-phase
Frequency	47–63 Hz
Inrush current	40 A peak maximum (soft start)
Efficiency	Up to 85% at full load
Power factor	0.99 typical
Turn-on time	Ac on 1.5 s typical, inhibit/enable 150 ms typical, configurable through I ² C; 50 ms internal turn-on delay (dual output only)
Hold-up time	10 ms minimum
AC OK	>5 ms early warning before outputs lose regulation, full cycle ride at 50 Hz, configurable through I ² C
OUTPUT	
Output voltage range	±10% minimum for all outputs, user-adjustable pot, full adjustment range using I ² C
Factory set point accuracy	1%
I ² C output program accuracy	±5%
Margining	±4–6% nominal analog (single output module only)
Line/load regulation	0.4% or 20 mV maximum (1% maximum for 1500 W module)
Ripple	RMS: 0.1% or 10 mV maximum; Pk-Pk: 1.0% or 50 mV maximum; bandwidth limited to 20 MHz
Dynamic response	<2% or 100 mV with 25% load step
Recovery time	Within 1% in <300 μs
Overcurrent protection	Single output module and main output of the dual output module 105–120% of rated output current. Aux output of dual output module 105–140% of rated output current. Special programmable OCP delay on 1500 W module from 100 ms to 25.5 s with shutdown features. Configurable through I ² C with load calibration required (except for 1500 W module).
Short-circuit protection	Protected for continuous short-circuit; recovery is automatic upon removal of short. Shutdown mode available on the 1500 W module.
Overvoltage protection	Single output module: 2–5.5 V, 122–134%; 6–60 V, 110–120% Dual output module: 2–6 V, 122–134%; 8–28 V, 110–120% Triple output module: No overvoltage protection provided Configurable through I ² C
Thermal protection	All outputs are disabled when the internal temperature exceeds the safe operating range; configurable through I ² C
Remote sense	Up to 0.5 V drop (not available on triple output module)
Single wire parallel	Current share to within 2% of total rated current
DC OK	±5% of nominal; configurable through I ² C
Minimum load	Not required
Housekeeping bias voltage	5 V dc @ 1.0 A maximum present whenever ac input is applied
Module inhibit	Configured and controlled through I ² C
Output/output isolation	>1 MΩ, 500 V
Global inhibit/enable	TTL, Logic “1” and Logic “0”; configurable through I ² C
ENVIRONMENTAL	
Operating temperature	-40 °C to +70 °C ambient, derate each output 2.5% per degree from 50 °C to 70 °C, -20 °C start up
Storage temperature	-40 °C to +85 °C
Humidity	10% to 95% RH, non-condensing
Vibration	IEC68-2-6 to the levels of IEC721-3-2
MTBF demonstrated	>550,000 hr. @ full load, 220 V ac, 25 °C ambient
SAFETY	
Electromagnetic susceptibility	EN61000-4-2, EN61000-4-4, EN61000-4-5 Level 3
Conducted EMI	CISPR 22/EN55022 Level B when installed in a properly grounded and shielded metal enclosure
Radiated EMI	CISPR 22/EN55022 Level B when installed in a properly grounded and shielded metal enclosure
Certifications	 UL/CSA 60950-1 2 nd Edition, CE to LVD 2006/95/EC, EN60950-1/A11:2009
GENERAL	
Case specifications	S3H3 Series: 5 in. x 5 in. x 11 in. [127.0 mm x 127.0 mm x 279.4 mm], 3210 W, 09 slots available, 6.0 lb. S3H5 Series: 5 in. x 8 in. x 11 in. [127.0 mm x 203.2 mm x 279.4 mm], 4920 W, 14 slots available, 9.0 lb.
Module weights	210 W single: 0.6 lb.; 360 W single: 1.0 lb.; 600 W single: 2.0 lb.; 750 W single: 1.6 lb.; 1500 W single: 2.0 lb.; 144 W dual: 0.6 lb.; 36 W triple: 0.5 lb.
Limited warranty	3 years

Connectors

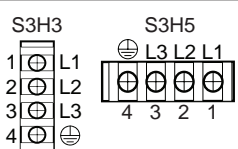
Table 2: Ac Input			
		PIN #	FUNCTION
 <p>S3H3: FOUR M3 SCREWS S3H5: THREE M3.5 SCREWS 6 in.-lb. (0.67 N-m) MAX. TORQUE</p>		1	Line 1
		2	Line 2
		3	Line 3
		4	Chassis (earth) ground

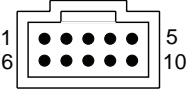
Table 3: PFC Input Connector (Control & Signals)		
<div>Connector J1</div>  <p>MATES WITH: MOLEX 90142-0010 HOUSING MOLEX 90119-2110 TERMINAL CONNECTOR KIT AVAILABLE, PART NUMBER 70-841-004</p>	PIN #	FUNCTION
	1	Input ac OK (emitter)
	2	Input ac OK (collector)
	3	Global dc OK (emitter)
	4	Global dc OK (collector)
	5	No connection
	6	Global inhibit/optional enable logic "0"
	7	Global inhibit/optional enable logic "1"
	8	Global inhibit/optional enable return
	9	+5 VSB housekeeping (1 A max.)
10	+5 VSB housekeeping return	

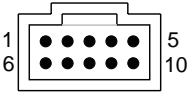
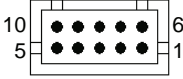
Table 4: Dc Output Module Connector (Control & Signals)		
<div><p>Connector J1</p><p>MATES WITH: MOLEX 90142-0010 HOUSING MOLEX 90119-2110 TERMINAL CONNECTOR KIT AVAILABLE, PART NUMBER 70-841-004</p></div>	PIN #	FUNCTION
	1	+ Remote sense (single or dual o/p main)
	2	Remote margin/V. program (single o/p)
	3	Margin high (single o/p)
	4	- Remote sense/margin low (single or dual o/p main)
	5	Spare
	6	Module isolated inhibit (single or dual o/p)
	7	Module inhibit return (single or dual o/p)
	8	Current share (SWP) (single or dual o/p main)
	9	+ Remote sense V2 (dual o/p, single is spare)
10	- Remote sense V2 (dual o/p, single is spare)	

Table 5: I ² C Bus Output Connector		
<div>Connector J2</div>  <p>MATES WITH: JST PHDR-10VS HOUSING JST SPHD-002T-P0.5 TERMINAL (FOR 24–28 AWG WIRE) JST SPHD-001T-P0.5 TERMINAL (FOR 24–28 AWG WIRE) OR LANDWIN 2050S1000 HOUSING LANDWIN 2053T011P TERMINAL CONNECTOR KIT AVAILABLE, PART NUMBER 70-841-023</p>	PIN #	FUNCTION
	1	No connection
	2	
	3	
	4	Serial clock signal (SCL)
	5	Serial data signal (SDA)
	6	Address bit 0 (A0)
	7	Address bit 1 (A1)
	8	Address bit 2 (A2)
	9	Secondary return (GND)
10	5 VCC external bus (1 A max.)	

NOTES:

- M4 x 8mm screws for all single output modules; maximum torque is 10 in.-lb. (1.13 N-m). M3 x 8mm screws for dual output module; maximum torque is 5 in.-lb. (0.57 N-m).
- 36 W triple output module mates with Molex 09-91-0600 housing and Molex 26-60-5060 terminal.
- Single and dual output modules have a green DC OK LED.

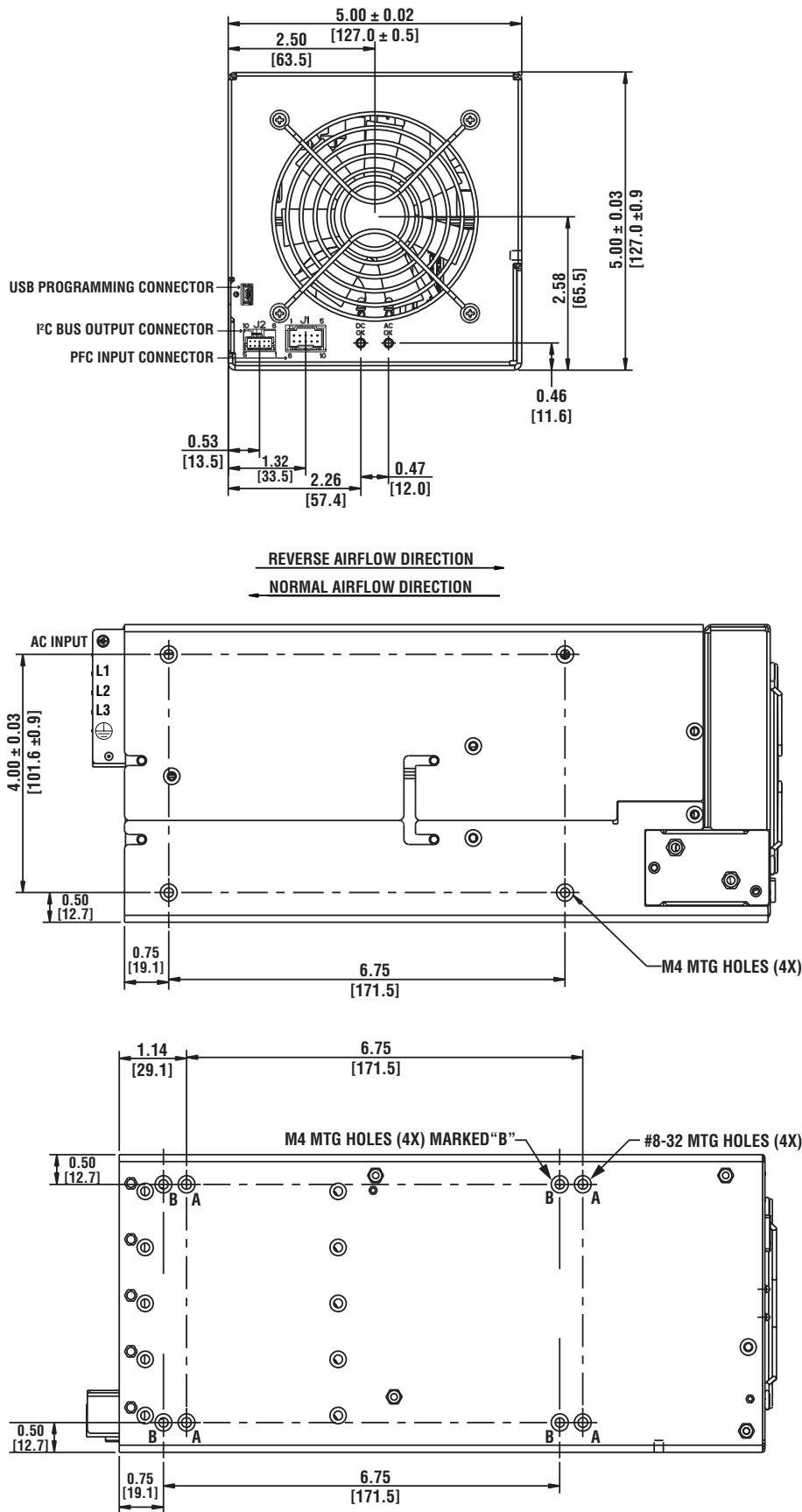
Installation/Safety Requirements

⚠ WARNING—RISK OF ELECTRICAL SHOCK

No user-serviceable parts. Do not open the power supply. Do not replace components.

- The earth ground wire must be connected only to the point marked with the earth ground symbol (on the unit). If the earth ground wire is connected by a screw, the wire must have a ring terminal secured by a lock washer to prevent accidental loosening.
- A safety approved (e.g. UL, CSA, CE) power cord and plug, with an appropriate wire gauge for the rated input current, must be provided by the end system manufacturer. Additional ferrites may be required on the power cord for radiated emissions testing and are system dependent.
- The power supply must be installed in a properly grounded and shielded metal enclosure.
- An accessible disconnect device shall be installed external to the equipment.
- The power supply is CE marked following the provisions of the Low Voltage Directive 2006/95/EC only.
- Please refer to our Web site for additional information on the optional CANBUS/RS485 interface.

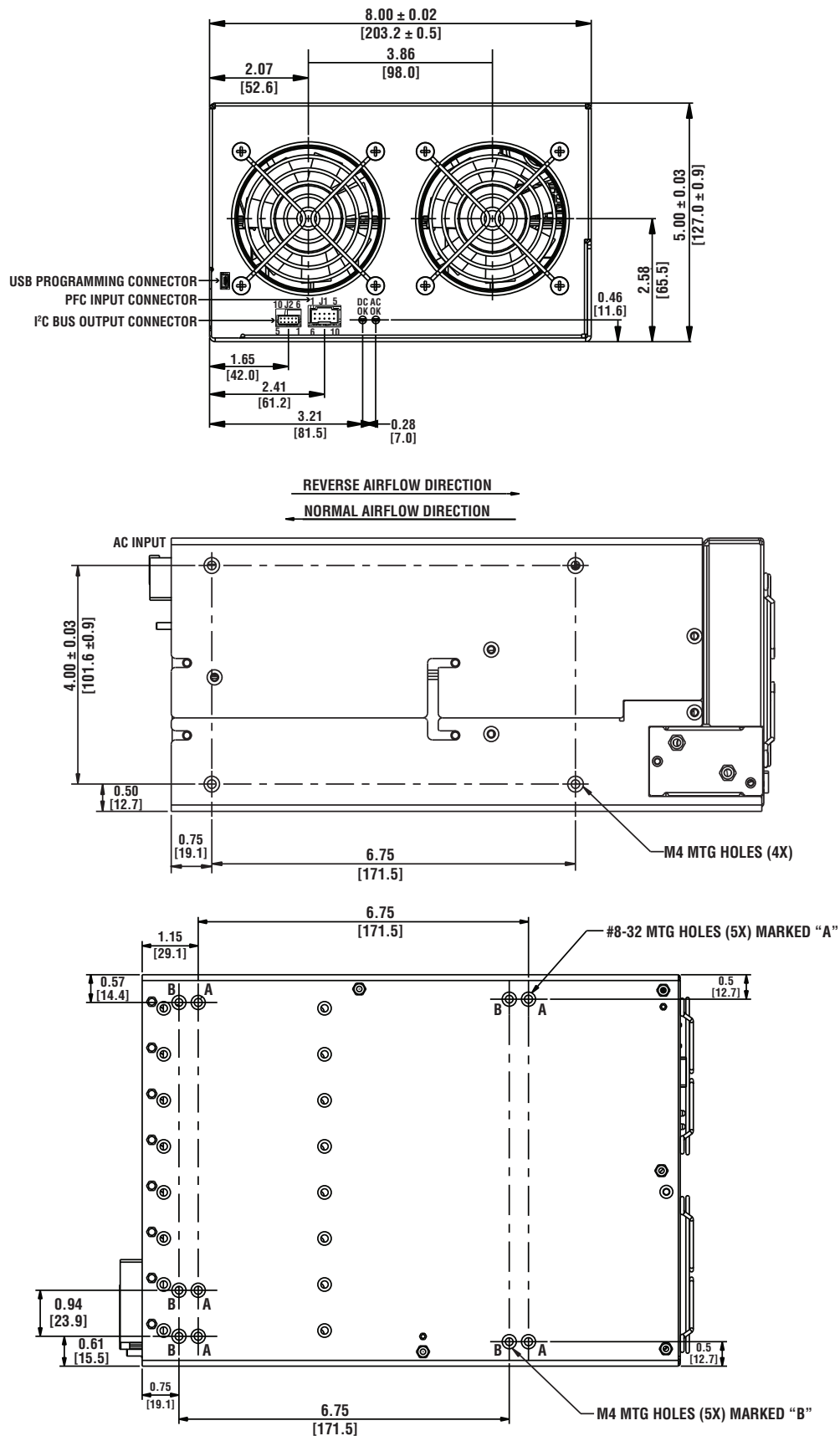
S3H3 Series (3210 W Maximum)



NOTES:

- M4 mounting holes on 3 sides; #8-32 mounting holes on the bottom. Maximum penetration is 0.155 in. (4.0 mm); maximum torque is 5 in.-lb. (0.57 N-m).
- All dimensions are typical, with inches and [millimeters] shown.

S3H5 Series (4920 W Maximum)



NOTES:

- M4 mounting holes on 3 sides; #8-32 mounting holes on the bottom. Maximum penetration is 0.155 in. (4.0 mm); maximum torque is 5 in.-lb. (0.57 N-m).
- All dimensions are typical, with inches and [millimeters] shown.